1   WHAT IS CLAIMED IS:

2   1. A signal processing building block for use in an adaptive signal processing

3   system comprising:

4   a main input channel which receives a main input signal;

5   an auxiliary input channel which receives an auxiliary input signal; and

6   a processing mechanism that:

7   generates a complex adaptive weight,

8   applies the computed complex adaptive weight to a function of the main input

9   signal and the auxiliary input signal to generate an output signal.

10

11   2. An adaptive signal processing system as in claim 1, wherein the processing

12   system generates a complex adaptive weight which comprises: a sample median value of

13   the real part of the ratio of a main input weight training data signal to an auxiliary input

14   weight training data signal, and a sample median value of the imaginary part of the ratio of

15   a main input weight training data signal to an auxiliary input weight training data signal.

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17   3. An adaptive signal processing system as in claim 1, wherein the processing

18   system generates a complex adaptive weight which comprises a sample median value of

19   the real part of a ratio of a main input weight training data signal to an auxiliary input

20   weight training data signal.

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1   4. An adaptive signal processing system as claimed in claim 1,

2   wherein the processing mechanism generates the complex adaptive weight, w_{med},

3   by solving the equation:

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$$w_{med} = \underset{k=1\,to\,K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1\,to\,K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

5   where K is the number of weight training data samples, z is the main input signal, j is a

6   unit imaginary number, and x is the auxiliary input signal.

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8   5. An adaptive signal processing system as claimed in claim 4, wherein the

9   processing mechanism generates the output signal, r, by solving the equation:

10   $r = z - w^*_{med}\ x.$

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12   6. An adaptive signal processing system for receiving a plurality of input signals

13   corresponding to a common target signal and for sequentially decorrelating the input

14   signals to cancel the correlated noise components therefrom, the adaptive signal processing

15   system comprising:

16   a plurality of building blocks arranged in a cascaded configuration for sequentially

17   decorrelating each of the input signals from each other of the input signals to thereby yield

18   a single filtered output signal;

19   wherein each building block includes:

20   a local main input channel which receives a local main input signal,

21   a local auxiliary input channel which receives a local auxiliary input signal,

22   and

1   a processing mechanism that

2   calculates a complex adaptive weight, and

3   generates a local output signal, utilizing the complex adaptive

4   weight.

5

6   7. An adaptive signal processing system as in claim 6, wherein the complex

7   adaptive weight comprises: a sample median value of the real part of the ratio of a main

8   input weight training data signal to an auxiliary input weight training data signal, and a

9   sample median value of the imaginary part of the ratio of a main input weight training data

10   signal to an auxiliary input weight training data signal..

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12   8. An adaptive signal processing system as in claim 6, wherein each building block

13   supplies the local output signal to a local output channel.

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15   9. An adaptive signal processing system as claimed in claim 6,

16   wherein each building block generates the complex adaptive weight, w_{med}, by

17   solving the equation:

18
$$w_{med} = \underset{k=1\,to\,K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1\,to\,K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

19   where K is the number of weight training data samples, z is the local main input signal, j is

20   a unit imaginary number, and x is the local auxiliary input signal; and

21   each building block generates the local output signal, r, by solving the equation:

22             $r = z - w^*_{med}\, x.$

1   10. An adaptive signal processing method comprising:

2   receiving a plurality of input signals corresponding to a common target signal;

3   inputting the input signals into a plurality of building blocks arranged in a cascade

4   configuration for sequentially decorrelating each of the input signals from each other of the

5   input signals;

6   generating a single filtered output signal;

7   wherein each building block includes a local main input channel which receives a

8   local main input signal, a local auxiliary input channel which receives a local auxiliary

9   input signal, and a processing mechanism that calculates a complex adaptive weight, and

10   generates a local output signal, utilizing the complex adaptive weight.

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12   11. An adaptive signal processing method as in claim 10, wherein each building

13   block generates the complex adaptive weight w_{med} by calculating a sample median value

14   of the real part of a ratio of a main input weight training data signal to an auxiliary input

15   weight training data signal and calculating a sample median value of the imaginary part of

16   the ratio of a main input weight training data signal to an auxiliary input weight training

17   data signal.

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19   12. An adaptive signal processing method as in claim 10, wherein each building

20   block generates the complex adaptive weight w_{med} by calculating a sample median value

21   of the real part of the ratio of a main input weight training data signal to an auxiliary input

22   weight training data signal.

23

1   13.   An adaptive signal processing method as in claim 10, wherein each building

2   block generates the complex adaptive weight w_{med} by calculating a sample median value

3   of the imaginary part of a ratio of a main input weight training data signal to an auxiliary

4   input weight training data signal.

5

6   14.   An adaptive signal processing method as claimed in claim 10,

7   wherein each building block generates the complex adaptive weight, w_{med}, by

8   solving the equation:

9    $$w_{med} = \underset{k=1\,to\,K}{MED}\left[real\left(\frac{z(k)^*}{x(k)^*} \right) \right] + j\left\{ \underset{k=1\,to\,K}{MED}\left[imag\left(\frac{z(k)^*}{x(k)^*} \right) \right] \right\}$$

10   where K is the number of weight training data samples, z is the local main input signal, j is

11   the unit imaginary vector, and x is the local auxiliary input signal.

12

13   15.   An adaptive signal processing method as claimed in claim 14, wherein each

14   building block generates the local output signal, r, by solving the equation:

15   $r = z - w^*_{med} x.$

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17   16.   An adaptive signal processing system comprising:

18   a means for receiving a plurality of input signals corresponding to the same target

19   signal;

20   a means for inputting the input signals into a plurality of building blocks arranged

21   in a cascade configuration for sequentially decorrelating each of the input signals from

22   each other of the input signals;